



## California's Emission Reduction Plan for Ports and International Goods Movement

Alternative Maritime Power Conference  
Los Angeles Harbor Hotel  
April 24, 2006



California Environmental Protection Agency  
Air Resources Board

## Emission Reduction Plan Development

- December 2005 draft plan
  - Ports and international goods movement
- March 2006 proposed plan
  - Expanded to include all goods movement
  - Regional analyses added
- Plan approved by Board on April 20, 2006

## Emission Reduction Plan Goals

- Meet federal air quality standards
- Reduce community exposure to toxic air contaminants
- Mitigate anticipated growth in trade and associated emissions
- Identify funding needs

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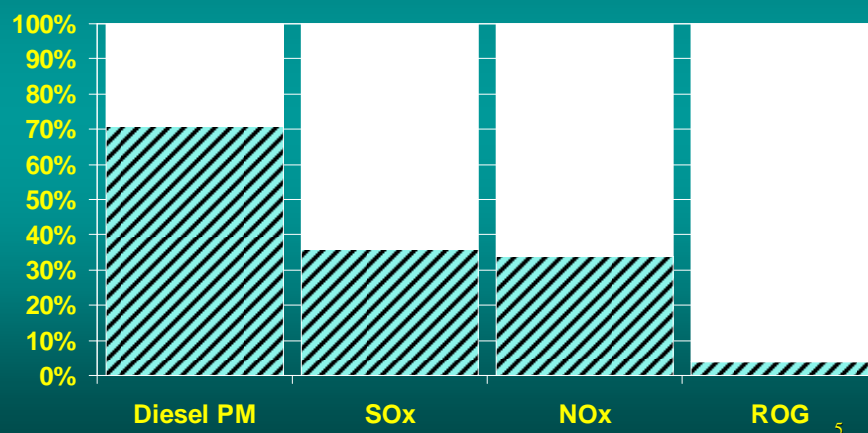
## Emission Reduction Plan Features



- By 2010, reduce emissions to 2001 levels
- By 2020, cut diesel PM risk 85%
- Reduce NOx in South Coast 30% in 2015, 50% in 2020
- Apply strategies statewide to aid in attainment

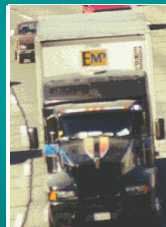
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## Goods Movement Contribution to Statewide Emissions in 2005

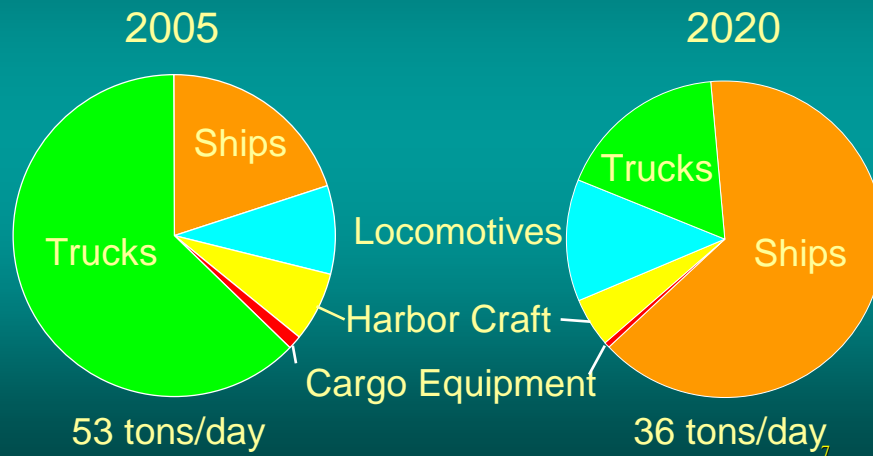


## Key Emission Sources from Goods Movement

- Heavy diesel trucks
- Locomotives
- Ships
- Harbor craft
- Cargo handling equipment



## Diesel PM from Goods Movement by Emission Source



## Basic Approach of Plan

- Cleaner engines and fuels
- Fleet modernization (retrofit or replace)
- Speed reduction and idling limits
- Shore-based power
- Potential mechanisms include rules, fees/incentives, market concepts, enforceable agreements

## Ships New Strategies

- Cleaner new engines and fuels
- Add-on emission controls
- Operational changes
- Shore-based electrical power in port (also called cold ironing)



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## Ships at Sea

- Cleaner propulsion engine fuel
- Retrofit controls for existing engines
- Cleaner new ships in California service



	Ship Visits by Year		
	2010	2015	2020
30% Lower Emissions	20%	50%	40%
Best Available Controls	--	25%	50%

## Ships In/Near Port

- ARB rule for cleaner auxiliary engine fuel (Adopted December 2005)
- Strategy to ramp up use of shore power

	Ship Visits by Year		
	2010	2015	2020
Shore Power	20%	60%	80%
Alternate Measures	20%	40%	20%

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## Auxiliary Engine Fuel Regulation for Ocean-Going Vessels

- Within 24 nautical miles of coastline
- Requires use of marine gas oil or 0.5% sulfur distillate fuel by January 1, 2007
- Requires use of 0.1% sulfur distillate fuel by January 1, 2010
- Fuel supply review in 2008

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## Auxiliary Engine Fuel Regulation (cont.)

- Allows for an Alternative Compliance Plan
  - Encourages use of shore power
- Includes Noncompliance Fee Provision

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## ARB's Cold-Ironing Evaluation Report (March 2006)



- Most cost-effective for container, passenger, and refrigerated cargo ships
- Prime candidate ports: LA, Long Beach, Oakland, San Diego, SF, and Hueneme
- 2/3 of capital costs & benefits at LA/Long Beach
- Not cost-effective for ships with irregular or infrequent visits to California
- Will require significant infrastructure investments

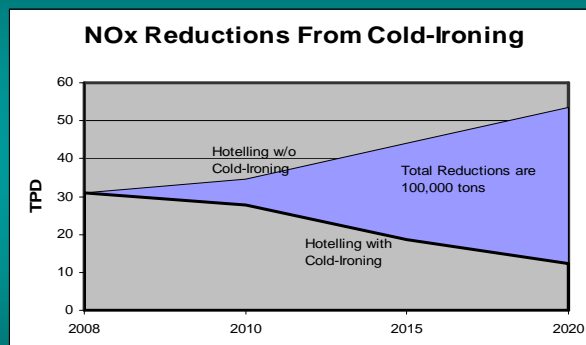
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## Details of Cost-Effectiveness Analysis

- Estimated ship cost: \$500,000 to \$1.5 million
- Estimated shore cost: \$3.5 million per terminal plus \$1.5 million per berth
- Analyzed 0.5% and 0.1% sulfur distillate fuel
- Analyzed all pollutants reduced (NOx, SOx, and PM), NOx-only, PM-only
- Analyzed three scenarios:
  - All ships visiting a port
  - Ships visiting 3 or more times per year
  - Ships visiting 6 or more times per year

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## Emission Benefits from Cold-Ironing



\* Based on 20%, 60%, and 80% shore power targets

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## Harbor Craft New Strategies



- ARB fleet rule for existing engines
- Shore-based electrical power in port
- Tighter U.S. EPA emission standards for new engines (or ARB adoption)

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## Cargo Equipment New Strategies



- ARB rule for new and existing equipment (Adopted December 2005)
- 85% PM control on all engines if additional retrofits verified

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## **Cargo Handling Equipment Regulation (Yard Trucks)**

- New equipment must meet performance standards by January 1, 2007
- Repower/replace in-use equipment or retrofit with verified controls starting Dec. 31, 2007
- Most pre-2003 yard trucks replaced by end of 2010

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## **Other Yard Equipment (Cranes, Top Handlers, Dozers)**

- New equipment must meet performance standards by January 1, 2007
- Repower/replace in-use equipment or retrofit with verified controls starting Dec. 31, 2007
- Oldest engines (pre-1998) must comply first
- Longer compliance schedule than for yard trucks due to diversity of equipment

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## Trucks New Strategies

- Proposed port truck modernization program
- Developing rule for privately-owned truck fleets
- Enhanced enforcement of truck idling limits in communities
- ARB rule for international trucks (Adopted January 2006)



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## ARB's Port Truck Modernization Report (April 2006)

### Basic elements in plan

- Incentives to replace oldest trucks and retrofit controls on the rest
- ARB rule to push owners to take advantage of incentives
- Terminals key participants

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## Port Truck Modernization Report (cont.)

- Plan would significantly reduce emissions in communities
- Funding and enforcement mechanisms needed

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## Rail Yard Locomotives New Strategies



Upgrade switcher/local yard locomotives

- Multiple off-road engines (gen-sets)
- Diesel-electric engines (Green Goats)
- Alternative fuels

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## Long-Haul Locomotives New Strategies



- National Tier 3 locomotive standards
  - Should include 90%+ PM/NOx control, rebuild standards, OBD, anti-idling devices
- Tier 3 locomotives use greatly accelerated in California service

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## Other Strategies

- Operational efficiency
- Land use decisions
- Project and community specific mitigation
- Port programs

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## Benefits of Plan to Public Health

- Avoid 820 annual premature deaths by 2020, reduce other health impacts
- Reduce risk by 85% in impacted communities
- Provide reductions that are necessary to attain air quality standards

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## Implementation Strategies

- New Regulations
- Pursue Incentives/Funding Opportunities
- Explore other mechanisms to meet plan goals

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